## Remarks

Claims 1-45 are currently pending in this application.

Claims 11 and 15 are objected to because of the following formalities: Claim 11 is grammatically incorrect in line 2. Claim 15 contains a spelling error in line 4.

The applicant would like to thank the examiner for pointing out these typographical errors, which have now been corrected by way of amendment.

Claims 1-4, 14-17, 27-30 and 44-45 have been rejected under 35 U.S.C. § 102 (e) as being anticipated by Klekamp et al.(US 2002/0039474).

The primary reference cited against the claims of the instant invention is U.S patent application 2002/00394 to Klekamp et al. The applicants' invention defined in the claims of this application were conceived and reduced to practice prior to the effective United States filing date, August 22, 2001, of Klekamp et al. It is therefore the applicants' view that Klekamp is not citable against the claims of this application.

An attached declaration under 37 CFR 1.131 testifies that the claimed invention was conceived by the inventors prior to August 22, 2001. Attached to the declaration under 37 CFR 1.131 are exhibits A and B which corroborate an invention date before August 22, 2001.

Claim 1 of the instant application defines

A planar lightwave circuit, comprising:
at least one optical waveguide core;
at least one feature proximate the core having at least one stress-engineered property to balance stress and therefore minimize birefringence affecting the core; and
a protective passivation layer formed over the core and the feature, the passivation layer formed to be substantially non-interfering with the balanced stress affecting the core provided by the feature.

Exhibit A attached to the declaration under 37 CFR 1.131 and dated March 20, 2001, clearly shows in Figure 1 with accompanying Table 1 the core overetch region which is a feature proximate to the core having at least one stress-engineered property to balance the stress and therefore minimize birefringence in the core. Exhibit B attached to the declaration under 37 CFR 1.131 and dated August 3, 2001, defines a passivation layer as defined in claim 1. A practical implementation and explanation of the overetch region is described in detail in Exhibit A overcome the unwanted birefringence normally associated with such waveguide structures.

Claim 2 defines the planar lightwave circuit of claim 1, wherein the at least one feature comprises an overcladding layer formed over the core, and doped to balance stress affecting the core. This overcladding layer formed over the core and doped to balance stress is shown in Figure 1 on page 2 of Exhibit A.

Claim 3 defines the planar lightwave circuit of claim 2, further comprising:

a substrate; and
an undercladding formed over the substrate and under the core;
wherein the overcladding is doped to have a coefficient of thermal expansion approximately matched to that of the substrate to thereby symmetrically distribute stress in the undercladding between the overcladding and the substrate, and therefore away from the core.

Although this claim is novel importing the limitations of claims 1 and 2, believed to be novel, the features defined in claim 3 are described in Exhibit A. The report (Exhibit A) described overcladding stress by considering the thickness of the overclad; Figure 3 illustrates how birefringence can be reduced by tailoring the upper clad thickness.

Claim 4 is believed to be novel importing the novelty of claims 3, 2, and 1 from which it depends. Notwithstanding, Claim 4 adds further novelty by defining:

the planar lightwave circuit of claim 3, wherein the protective passivation layer is formed to have a coefficient of thermal expansion approximately matched to that of the overcladding such that it is substantially non-interfering with the balanced stress affecting the core provided by the overcladding.

Fig. 3 shows birefringence parametric sensitivity tuning upper cladding stress and overetch by way of simulation.

Claim 6 defines the planar lightwave circuit of claim 4, wherein the at least one feature comprises portions of the undercladding, respectively adjacent to each lower edge of the core, terminating at a point lower than the core, to further effect a removal of stress away from the core.

Figure 1 of Exhibit A illustrates the inventive concept of terminating the undercladding below the core for birefringence minimization. Table 1, Core Overetch (row) indicates how this parameter sensitivity was investigated in this simulation for instances of 0.75 microns, 0.5 microns and 1.0 micron; the results, in Figure 3 of the same document indicates that this parameter has the highest sensitivity in the mode with respect to the waveguide birefringence which decreases from 9.1E-05 (at 0.5 microns core overetch to 6.6E-05 at 1.0 microns overetch. This discovery provided the applicant with the direction for pursuing this as a parameter of importance for birefringence minimization.

Claim 13 is believed to be patentable importing the novelty from claim 1, from which it depends.

Claim 14 defines a method for forming a planar lightwave circuit, comprising:

forming at least one optical waveguide core;
forming at least one feature proximate the core having at least one stress-engineered property to balance stress and therefore minimize birefringence affecting the core; and
forming a protective passivation layer over the core and the feature, the passivation layer formed to be substantially non-

interfering with the balanced stress affecting the core provided by the feature.

The method steps defined in claim 14 correspond to the elements defined in claim 1 and are disclosed in Exhibits A and B. Claim 14 is believed to be patentable.

Claims 15-17, dependent on claim 14, are believed to be patentable, importing the novelty of the novel claims from which they depend; furthermore the features defined in these claims are shown to have been invented by the applicants prior to the effective US filing date of US 2002/0039474 to Klekamp et al.

Claim 27 defines a method for protecting, and balancing stress in, a planar lightwave circuit having at least one optical waveguide core, comprising:

using at least one feature proximate the core embodying at least one stress-engineered property to balance stress and therefore minimize birefringence affecting the core; and using a protective passivation layer over the core and the feature, the passivation layer formed to be substantially non-interfering with the balanced stress affecting the core provided by the feature.

Both of these method steps are disclosed in Exhibits A and B.

Claims 28-30 and 32 import the novelty of the claims from which they depend and also add further novelty. The base claim from which they depend is believed to be novel as the cited

Klekamp reference is not citable in view of applicants' invention date preceding Klekamp's US effective filing date.

Claims 6, 13, 19, 26, 32, and 39 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Klekamp et al. The examiner points out that regarding claims 6, 13, 19, 26, 32, and 39 "Klekamp teaches planar lightwave circuit layers and features above in references to prior art."

The applicant respectfully submits that these claims are patentable and Klekamp et al. is not a citable prior art reference in view of the applicants having conceived the claimed invention prior to the effective US filing date of Klekamp.

The applicant would like to thank the examiner for this thorough examination and finding claim 41 allowable, and for indicating that claims 5, 7-12, 18, 20-25, 31, 33-38 to be allowable if re-written in independent form including all of the limitations of the base claim and any intervening claims.

It is acknowledged that these claims would be allowable over the cited prior art of record re-written in independent form. However, it is the applicant's view that the base claims and all intervening claims are patentable in view of the cited Klekamp et al. U.S. patent application not being a citable reference considering that the applicant's invention date precedes the effective filing date of the Klekamp application. Applicant respectfully requests reconsideration of these claims.

Claims 40, 42 and 43 have been rejected under 35 U.S.C. § 102 (b) as being anticipated by Wildermuth. The applicant has cancelled these claims to expedite allowance of this application.

In view of the foregoing, it is respectfully submitted that Klekamp is not a citable reference and all of the claims remaining in the application are in condition for allowance.

Early and favorable consideration would be appreciated.

Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account No. 50-1465 and please credit any excess fees to such deposit account.

Respectfully submitted,

Mr. Charles Wands
Reg. No.: 25,649

December 10, 2003
Date:

27975
PATENT TRADEMARK OFFICE